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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/673,570

09/30/2003

Bo Xu

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4651

59796

7590

10/01/2007

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EXAMINER

AZAD, ABUL K

ART UNIT

PAPER NUMBER

2626

MAIL DATE

DELIVERY MODE

10/01/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/673,570

Applicant(s)

XU ET AL.

Examiner

ABUL K. AZAD

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5, 7-9, 11-14, 16-22, 24, 25, 27 and 28 is/are rejected.
- 7) ☒ Claim(s) 3, 6, 10, 15, 23, 26 and 29 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application
- ☐ Other: ____.

DETAILED ACTION

Response to Amendment

1. This action is in response to the communication filed on July 20, 2007.
2. Claims 1-29 are pending in this action.
3. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 4, 5, 8, 12-14, 16, 18, 20-22, 24, 25 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Bloebaum et al. (US 6,070,137).

As per claim 1, Bloebaum teaches, "a method, comprising":

"estimating the noise power spectrum for each frame of an audio signal based on a plurality of signal power spectrum values computed from a corresponding plurality of adjacent frames" (col. 4, lines 23-49);

"computing dynamically an over-subtraction factor for each frame of the audio signal based on the estimated noise power spectrum of the frame" (col. 6, lines 7-28, "subtraction factor δ ");

“reducing the signal power spectrum of the audio signal at each frame in accordance with the over-subtraction factor computed for the frame” (col. 6, lines 7-28).

As per claim 2, Bloebaum teaches, “computing the signal energy for each sub frequency band of each frame of the audio signal” (col. 6, line 42 to col. 7, line 4);

“deriving noise energy for each subband of each frame based on a plurality of signal energy values computed with respect to the same subband for a plurality of corresponding frames” (col. 6, line 42 to col. 7, line 4).

As per claim 4, Bloebaum teaches, “determining the signal to noise ratio of each frame based on the corresponding signal power spectrum and noise power spectrum computed and estimated for the frame” (col. 6, lines 7-28); and

“deriving an over-subtraction factor for the frame based on the signal to noise ratio dynamically determined for the frame” (col. 6, lines 7-28).

As per claim 5, Bloebaum teaches, “wherein the signal to noise ratio of the frame is computed as $SNR(r) = 10\log. \dots$

where $SNR(r)$ represents the signal to noise ratio estimated

the over-subtraction factor for the frame is computed based on the signal to noise ratio as: . . .” (col. 6, lines 7-28).

As per claim 8, Bloebaum teaches, “enhancing the audio signal to produce an enhanced audio signal via spectral subtraction using an over-subtraction amount dynamically computed based on the noise power spectrum of the audio signal estimated for each frame of the audio signal based on a plurality of signal power

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spectrum values of the audio signal computed from a corresponding plurality of adjacent frames and utilizing the enhanced audio signal" (col. 6, lines 7-28).

As per claim 12, Bloebaum teaches, "said enhancing is an embedded operation of said utilizing" (Fig. 3)

As per claims 13, 14, 16, 18, 20-22, 24, 25 and 27, they are interpreted and thus rejected for the same reasons set forth in the rejection of claims 1, 2, 4, 5, 8 and 12.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 7, 9, 11, 17, 19 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloebaum et al. as applied to claims 1, 8, 13, 18 and 27 above, and further in view of deVries (US 6,289,309).

As per claim 7, Bloebaum teaches, "performing a Fourier transform on the audio signal prior to said estimating the noise power spectrum to produce a transformed signal based on which the signal power spectrum of the audio signal is computed" (col. 5, lines 4-20); and

Bloebaum does not explicitly teach, "performing a corresponding inverse Fourier transform, after said subtracting". However, deVries teaches, "performing a

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corresponding inverse Fourier transform, after said subtracting" (Fig. 2, element 210).

Therefore, it would have been obvious to perform inverse Fourier transform, after subtracting because an ordinary skill in the art readily recognized that would provide enhanced audio signal for use in different purpose (col. 4, lines 7-20).

As per claims 9, 17, 19 and 28, they are interpreted and thus rejected for the same reasons set forth in the rejection of claim 7.

As per claim 11, Bloebaum does not explicitly teach speaker identification and speech recognition. However, deVries teaches speaker identification and speech recognition (col. 3, lines 34-39). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use for speaker identification and speech recognition because an ordinary skill in the art readily recognized that would provide better speaker and speech reorganization.

Allowable Subject Matter

8. Claims 3, 6, 10, 15, 23, 26 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Abul K. Azad** whose telephone number is **(571) 272-7599**. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Patric Edouard**, can be reached at **(571) 272-7603**.

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Any response to this action should be mailed to:

Commissioner for Patents

P.O. Box 1450


Alexandria, VA 22313-1450

Or faxed to: **(571) 273-8300**.

Hand-delivered responses should be brought to **401 Dulany Street, Alexandria, VA-22314** (Customer Service Window).

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

September 27, 2007


Abul K. Azad
Primary Examiner
Art Unit 2626